

REMARKS

Claim Rejections

Claims 1, 5, 7, 8 and 10 are rejected under 35 U.S.C. § 102(a) as being anticipated by Lin (U.S. 6,677,668). Claims 2-4 and 6 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Lin. Claim 9 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Lin in view of Bernier et al. (U.S. 5,847,929). Claim 11 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Lin in view of Chung et al. (U.S. 6,525,406). Claim 12 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Lin in view of Tao et al. (U.S. 6,191,360).

Drawings

Applicant proposed to amend Figure 1 as illustrated in red on the attached photocopy. In Figure 1 it is proposed to change line "3-3" to read --I-I--. No "new matter" has been added to the original disclosure by the proposed amendment to this figure. Approval of the proposed drawing change is respectfully requested.

It is noted that no Patent Drawing Review (Form PTO-948) was received with the outstanding Office Action. Thus, except for the above proposed drawing correction, Applicant must assume that the drawings are acceptable as filed.

Amendments to Specification

Applicant has amended the specification as noted above to cure obvious grammatical and idiomatic inaccuracies and to change reference number "333" to read --334--. No "new matter" has been added to the original disclosure by the foregoing amendments to the specification.

New Claims

By this Amendment, Applicant has canceled claims 1-12 and has added new claims 13-25 to this application. It is believed that the new claims specifically set forth each element of Applicant's invention in full compliance with 35 U.S.C. § 112, and define subject matter that is patentably distinguishable over the cited prior art, taken individually or in combination.

The new claims are directed toward a multi-chip package combining wire-bonding and flip-chip configuration comprising: a substrate (110) having an upper substrate surface (111) and a substrate lower surface (112), the upper substrate surface having a plurality of contact pads (113); at least one wire bonding chip (120, 170, 180) connected to the upper substrate surface and electrically connected to the substrate by a plurality of bonding wires (123); a molding compound (130) formed on the upper substrate surface covering each of the at least one wire bonding chip and the plurality of bonding wires, the molding compound having: two extensions (132); and at least one recession (131) located between the two extensions, the at least one recession being spaced apart from the plurality of constant pads; and at least one flip-chip electrical device (140) having a plurality of bumps (141) electrically connected to the plurality of contact pads of the substrate.

Applicant respectfully asserts that the amended dependent claim is patentably distinct from the prior art reference. Especially, the molding compound has two extensions to form a recession therebetween. The warpage of the substrate can be significantly reduced by the two extensions. See page 6, lines 14-15 in the specification.

Other embodiments of the present invention include: the distance between the at least one recession and the closest contact pad is greater than 1.0mm; the at least one recession has an arc shape; the at least one recession has a shape of a quarter of a circle; the at least one recession of the molding compound includes two recessions (221, 222); the molding compound has an U-shape; the molding compound has an L-shape; the at least one flip-chip electrical device is selected from a group consisting of a BGA package, a chip scale package, and a flip chip; a plurality of solder balls (150) located on the substrate lower surface; a heat sink (160) connected to the molding compound and the at least one flip-chip electrical device; the molding compound has at least one step (333) located on a surface opposite the substrate; the molding compound has at least one indentation (334) located on a surface opposite the substrate; and the substrate has a molding gate metal layer (114).

The primary reference to Lin teaches an integrated circuit chip (120) located on a substrate (110) and encapsulated by an encapsulation layer (125). Two test packages (160, 170) are also located on the substrate.

Lin does not teach a molding compound having two extensions; the molding compound having at least one recession located between the two extensions; the at least one recession being spaced apart from the plurality of contact pads. Therefore, nothing is taught or mentioned in Lin's disclosure that the molding compound has two extensions by which the warpage of the substrate is significantly reduced.

Besides, Lin does not teach the distance between the at least one recession and the closest contact pad is greater than 1.0mm; the at least one recession has an arc shape; the at least one recession has a shape of a quarter of a circle; the at least one recession of the molding compound includes two recessions; the molding compound has an U-shape; nor does Lin teach the molding compound has an L-shape.

It is axiomatic in U.S. patent law that, in order for a reference to anticipate a claimed structure, it must clearly disclose each and every feature of the claimed structure. Applicant submits that it is abundantly clear, as discussed above, that Lin does not disclose each and every feature of Applicant's new claims and, therefore, could not possibly anticipate these claims under 35 U.S.C. § 102. Absent a specific showing of these features, Lin cannot be said to anticipate any of Applicant's new claims under 35 U.S.C. § 102.

The secondary reference to Bernier et al. teaches a ceramic module having a top half (100), a semiconductor chip (106) connected to the top half, and an aluminum heat spreader (118) connected to the top half.

Bernier et al. do not teach a molding compound having two extensions; the molding compound having at least one recession located between the two extensions; the at least one recession being spaced apart from the plurality of contact pads; the distance between the at least one recession and the closest contact pad is greater than 1.0mm; the at least one recession has an arc shape; the at least one recession has a shape of a quarter of a circle; the at least one recession

of the molding compound includes two recessions; the molding compound has an U-shape; nor do Bernier et al. teach the molding compound has an L-shape.

The secondary reference to Chung et al. teaches a semiconductor device and is cited for teaching an indentation (48) formed in an upper edge of an encapsulation material (24).

Chung et al. do not teach a molding compound having two extensions; the molding compound having at least one recession located between the two extensions; the at least one recession being spaced apart from the plurality of contact pads; the distance between the at least one recession and the closest contact pad is greater than 1.0mm; the at least one recession has an arc shape; the at least one recession has a shape of a quarter of a circle; the at least one recession of the molding compound includes two recessions; the molding compound has an U-shape; nor do Chung et al. teach the molding compound has an L-shape.

The secondary reference to Tao et al. teaches a thermally enhanced BGA package and is cited for teaching a substrate (30) having a pad (32) connected to a heat spreader.

Tao et al. do not teach a molding compound having two extensions; the molding compound having at least one recession located between the two extensions; the at least one recession being spaced apart from the plurality of contact pads; the distance between the at least one recession and the closest contact pad is greater than 1.0mm; the at least one recession has an arc shape; the at least one recession has a shape of a quarter of a circle; the at least one recession of the molding compound includes two recessions; the molding compound has an U-shape; nor do Tao et al. teach the molding compound has an L-shape.

Even if the teachings of Lin, Bernier et al., Chung et al., and Tao et al. were combined, as suggested by the Examiner, the resultant combination does not suggest: a molding compound having two extensions; the molding compound having at least one recession located between the two extensions; the at least one recession being spaced apart from the plurality of contact pads; the distance between the at least one recession and the closest contact pad is greater than 1.0mm; the at least one recession has an arc shape; the at least one recession has a shape of a quarter of a circle; the at least one recession of the molding compound

includes two recessions; the molding compound has an U-shape; nor does the combination suggest the molding compound has an L-shape.

It is a basic principle of U.S. patent law that it is improper to arbitrarily pick and choose prior art patents and combine selected portions of the selected patents on the basis of Applicant's disclosure to create a hypothetical combination which allegedly renders a claim obvious, unless there is some direction in the selected prior art patents to combine the selected teachings in a manner so as to negate the patentability of the claimed subject matter. This principle was enunciated over 40 years ago by the Court of Customs and Patent Appeals in In re Rothermel and Waddell, 125 USPQ 328 (CCPA 1960) wherein the court stated, at page 331:

The examiner and the board in rejecting the appealed claims did so by what appears to us to be a piecemeal reconstruction of the prior art patents in the light of appellants' disclosure. ... It is easy now to attribute to this prior art the knowledge which was first made available by appellants and then to assume that it would have been obvious to one having the ordinary skill in the art to make these suggested reconstructions. While such a reconstruction of the art may be an alluring way to rationalize a rejection of the claims, it is not the type of rejection which the statute authorizes.

The same conclusion was later reached by the Court of Appeals for the Federal Circuit in Orthopedic Equipment Company Inc. v. United States, 217 USPQ 193 (Fed.Cir. 1983). In that decision, the court stated, at page 199:

As has been previously explained, the available art shows each of the elements of the claims in suit. Armed with this information, would it then be non-obvious to this person of ordinary skill in the art to coordinate these elements in the same manner as the claims in suit? The difficulty which attaches to all honest attempts to answer this question can be attributed to the strong temptation to rely on hindsight while undertaking this evaluation. It is wrong to use the patent in suit as a guide through the maze of prior art references, combining the right references in the right way so as to achieve the result of the claims in suit. Monday morning

quarterbacking is quite improper when resolving the question of non-obviousness in a court of law.

In In re Geiger, 2 USPQ2d, 1276 (Fed.Cir. 1987) the court stated, at page 1278:

We agree with appellant that the PTO has failed to establish a *prima facie* case of obviousness. Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching suggestion or incentive supporting the combination.

Applicant submits that there is not the slightest suggestion in either Lin, Bernier et al., Chung et al., or Tao et al. that their respective teachings may be combined as suggested by the Examiner. Case law is clear that, absent any such teaching or suggestion in the prior art, such a combination cannot be made under 35 U.S.C. § 103.

Neither Lin, Bernier et al., Chung et al., nor Tao et al. disclose, or suggest a modification of their specifically disclosed structures that would lead one having ordinary skill in the art to arrive at Applicant's claimed structure. Applicant hereby respectfully submits that no combination of the cited prior art renders obvious Applicant's new claims.

Summary

In view of the foregoing amendments and remarks, Applicant submits that this application is now in condition for allowance and such action is respectfully requested. Should any points remain in issue, which the Examiner feels could best be resolved by either a personal or a telephone interview, it is urged that Applicant's local attorney be contacted at the exchange listed below.

Respectfully submitted,

Date: January 6, 2005

By:


Bruce H. Troxell
Reg. No. 26,592

TROXELL LAW OFFICE PLLC
5205 Leesburg Pike, Suite 1404
Falls Church, Virginia 22041
Telephone: 703 575-2711
Telefax: 703 575-2707

Application No. 10/781,876

IN THE DRAWINGS:

Please amend Figure 1 as illustrated on red on the attached photocopy.